CASE REPORT

Aneurysm formation of pericardial patch in Manouguian procedure

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Pericardial patch has been used to repair cardiac defects; however, its strength as an aortoplasty patch to tolerate systemic pressure is a matter of debate. We report an aneurysmal dilatation of pericardial patch in aortoplasty. Our patient was a 56-year-old female known case of rheumatic heart disease that underwent redoes mitral and aortic valve replacements along with Manouguian aortoplasty at the age of 44 years old. After 2 months, she was readmitted with a diagnosis of endocarditis. Echocardiography revealed a small cavity in the posterior wall of the aorta. She responded to medical therapy and discharged in a good condition. Twelve years later, she was scheduled to undergo reoperation due to a severe paraprosthetic aortic valve leakage and a pericardial patch aneurysm. The leaking prosthetic aortic valve was explanted and the aneurysmal tissue was replaced with a polyethylene terephthalate patch.

Keywords: Aortic valve replacement, Manouguian procedure, Pericardial patch aneurysm

1. Introduction

There is evidence evaluating the use of pericardium versus prosthetic patches to enlarge the annulus of the aorta to reduce patient–prosthesis mismatch [1]. Therefore, using pericardium became more common because of availability, pliability, resistance to infection, and nonimmunogenicity [2]. Cardiac surgeons utilized it to repair different cardiac defects with satisfactory results, but long-term complications and outcomes remain unclear [3] as its implantation has been reported to be challenging for aortic repair [4]. There have been few reports regarding aneurysm development in pericardial patch [2,4]; however, the proper management and prevention of such a complication is evolving.

2. Case presentation

The patient was a 56-year-old female with a history of mitral commissurotomy in the setting of rheumatic heart disease 24 years ago. At 44 years

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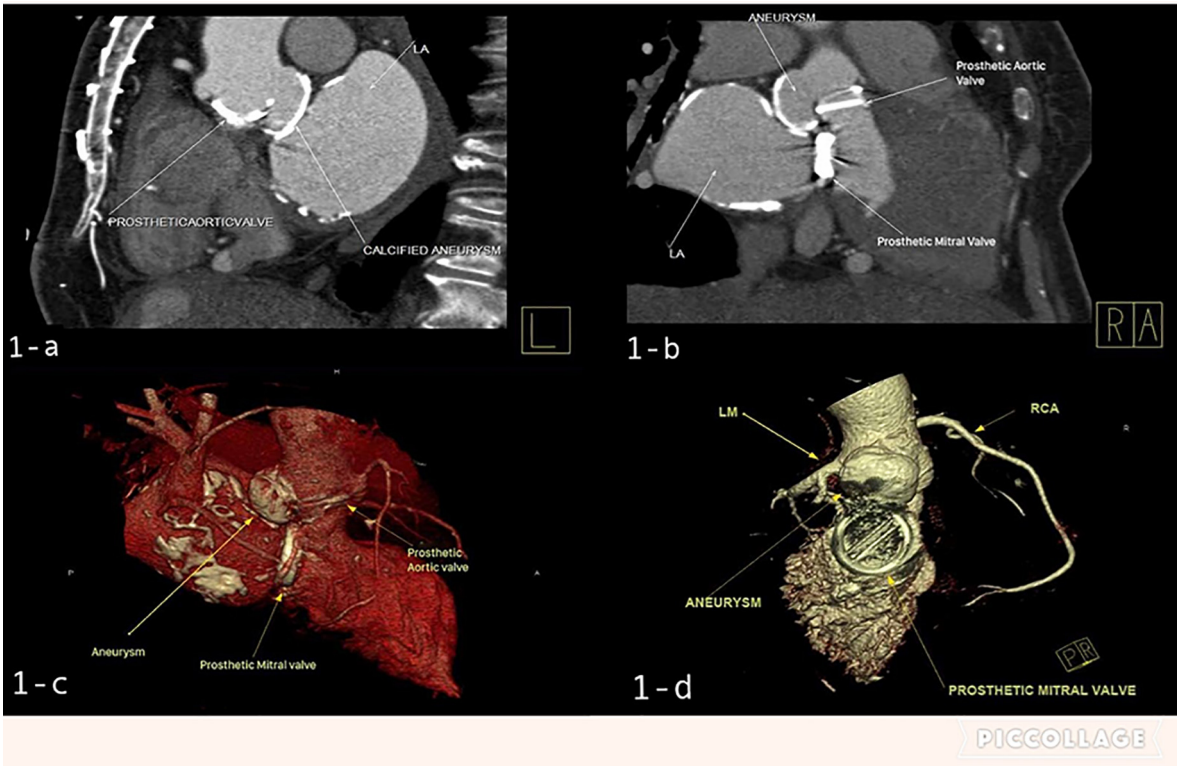

Figure 1. Computed tomography scan reconstructions showing aneurysm formation of pericardial patch. (A) Left sagittal; (B) right sagittal; (C) right three dimensional; (D) posterior three dimensional. LA, left atrium; LM, left main; RCA, right coronary artery.

old, she underwent aortic valve (AV) implantation using prosthetic valve size 21 (Sorin group, Milan, Italy) along with a Manouguian aortoplasty with a pericardial patch and mitral valve (MV) replacement using prosthetic valve size 27 (St. Jude Medical, USA). Two months later, she was readmitted with a diagnosis of endocarditis presenting with fever. Echocardiographic examination revealed a balloon cavity in the posterior wall of the aorta with connections to the left ventricle and aorta (size 2.1×1 cm) leading to paravalvular leak. She was followed up periodically for 12 years, when she developed a dyspnea functional Class II at 56 years old. Echocardiography showed a left ventricle ejection fraction of 50%, a pulmonary arterial pressure of 60 mmHg, a moderate to severe tricuspid valve regurgitation, and an acceptable prosthetic MV function. An aneurysm formation of the Manouguian pericardial patch significantly calcified and a severe paravalvular prosthetic AV leakage were also detected. Consequently, she was examined using a computed tomography scanning of the heart which confirmed the echocardiographic findings (Fig. 1). At

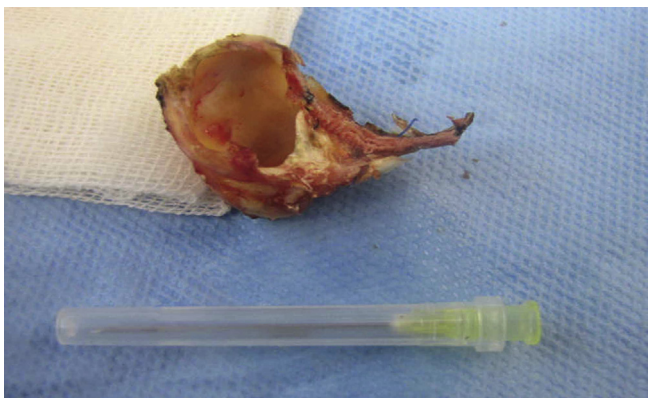

Figure 2. Excised tissue of pericardial aneurysm.

operation, an aneurysm with a severe calcification was found in a pericardial patch used for Manouguian aortoplasty which was totally excised (Fig. 2). Then a Manouguian aortoplasty using a polyethylene terephthalate patch associated with redo AV replacement with a prosthetic valve size 21 (St. Jude Medical, USA), and tricuspid valve replacement using prosthetic valve size 29 (Sorin group, Milan, Italy) were performed. The patient was discharged without any complications. She was followed up and her echocardiographic examination after 4 months was satisfactory (means of MV, tricuspid valve, and AV gradients were 4 mmHg, 4 mmHg, and 11 mmHg, respectively, without paravalvular leakage).

3. Discussion

An AV patient–prosthesis mismatch with first generation prosthetic heart valves were more common than new generations of prosthetic heart valves with greater effective orifice area, but it may still perform aortoplasty to prevent patient–prosthesis mismatch. One of the most used aortoplasty surgeries is the Manouguian procedure [4]. Using pericardial patch in this procedure has become more common which has been associated with more late complications, such as patch aneurysm, aortic dissection, paraaortic leakage, MV insufficiency [4], and endocarditis [3,4].

From two reports of patch aneurysm in the literature, the first one reported a case of aneurysm formation 69 months after surgery out of 31 patients undergoing AV replacement associated with Manouguian aortoplasty [4]. The second study is a case report of aortic root pericardial patch aneurysm formation 20 years after valve implantation, which progressed in size after 5 years. In their opinion, the implementation of pericardium in the systemic pressure increases the possibility of aneurysm formation. To reduce that risk, they have recommended pericardial fixation by immersion in glutaraldehyde before implantation [2]; although it is a matter of debate.

In conclusion, it is difficult to identify which etiology led to an aneurysm formation in our case; however, it may be attributed to factors, alone or in combination with each other, including an anatomic high-pressure area, the lack of glutaraldehyde fixation, or endocarditis. Further studies in this setting are required to elucidate the main causes of this clinical entity.

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